Impact of a Nordic diet on psychological function in young students

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Dependency to a Nordic diet and psychological function in young students

Abstract

Background: There has been a rapid increase in the prevalence of psychiatric and psychological disease has attracted interest in identifying modifiable lifestyle factors that may affect an individual's mood. Diet is one potential lifestyle factor that may affect psychological function. In the present study we aimed to investigate the relationship between adherence to the health-promoting Nordic diet (ND) with neuropsychological function in young women.

Methods: The study comprised 181 female students with an age between 18 to 25 years. Psychological function was evaluated using a series of standardized questionnaires, including: Cognitive Ability Questionnaire (CAQ), Depression Anxiety Stress Scales (DASS-21), Insomnia Severity Index (ISI), Epworth Sleep Scale (ESS) and Quality of Life (QoL). A validated food frequency (FFQ) questionnaire, which included 65 types of foods, was used to evaluate the amount of different foods consumed.

Result: Evaluation of the dietary composition of the participants showed that the rate of adherence to the ND was positively associated with total energy, carbohydrates, protein, fiber, iron, magnesium, potassium, zinc, folate, phosphorus, vitamin C, thiamine, riboflavin, niacin, vitamins B6 and B12, carotene, whole grain, legumes, cabbage/vegetables, vegetables and fruits ($P<0.05$). Linear regression showed cabbage/vegetable consumption was inversely related to scores of stress (β=-0.04; P=0.038) and anxiety (β=-0.02; 0.049) and, directly associated to quality of life score (0.02; P=0.036).

Conclusion: Adherence to a ND with high intake of cabbage/vegetable was inversely associated with stress and anxiety scores, and directly associated with health-related quality of life.

Keywords: Nordic diet; anxiety; Stress; Quality of Life; Vegetable

1- Introduction

Neuropsychological disorders affect millions of people globally (Sánchez-Villegas et al., 2013; Sanchez-Villegas and Martínez-González, 2013). The identification of modifiable risk factors for these disorders may provide an effective preventive strategy. The potential effect of diet on mental health has emerged as a subject of interest (Jacques and Tucker, 2001). Although there already exist some information on the role of individual nutrients and foods in nutritional epidemiology, this analysis has some limitations. Nutritional epidemiologists have emphasized the importance of using dietary pattern, rather than specific nutrients or foods, to consider associations with dietary diseases (Scarmeas et al., 2006; Hu, 2002). Several dietary patterns have been associated with improved neuropsychological performance; for example a Mediterranean diet (Psaltopoulou et al., 2013; Pagliai et al., 2018), that is characterized by foods traditionally consumed in Southern Europe. The Nordic diet (ND), a typical healthy diet from Northern Europe; However, the impact of adherence to a ND pattern is still relatively poorly investigated. A ND pattern is characterized by eating healthy foods include grains, fruits, vegetables, greens, rapeseed oil, fish, lean meats, low-fat dairy and less receive from sugar and, salt (Ramezani-Jolfaie et al., 2018), and based chiefly on foods originating from the Nordic region in Europe (Mithril et al., 2013).

A healthy diet is one factor that assists in the maintenance, improvement, and promotion of overall health, including mental and, social well-being (Mithril et al., 2012). Several studies have also investigated the association between diet and behavioral disorders, such as autism, hyperactivity, schizophrenia and depression (Sanchez-Villegas et al., 2006; Beaglehole, 2003), and have shown an association between diet and cognitive ability, or dementia (Kalmijn et al., 2004; Barberger-Gateau et al., 2007). A further study looked at the relationship between cognitive ability in middle age and diet, and found that better cognitive ability in adulthood was associated with eating more healthy foods such as vegetables, meat, nuts, legumes and fish (Crichton et al., 2015).

We hypothesized that an ND, based on the Nordic Nutrition Recommendations (Becker et al., 2004) may associated with better neuropsychological performance. The aim of the present study was to investigate the relationship between ND and neurological dysfunction and quality of life in young female students.

2- *Material and methods*

2-1: Study design

This cross-sectional study was undertaken in Birjand, South Khorasan, Iran, in January 2020 as described previously (Askari et al., 2020). A total of 330 females were initially screened for inclusion. Exclusion criteria were: having any acute or chronic illness with a medical history in the past, including any mental disorders such as depression or aggression. The final population sample comprised 181 healthy young women who were recruited from 5 different universities in Birjand, using a multistage cluster sampling method. Because we wanted to conduct our project on a homogeneous population to control potential confounders, only unmarried, apparent healthy, women aged 18-25 years were included. The Ethics Committee of Birjand University of Medical Sciences approved this study. All participants provided written informed consent to participate in this study.

2-2: Dietary intake assessment

A valid and reliable 65 item semi-quantitative food frequency questionnaire was applied to determine the food consumed over the previous year (Ahmadnezhad et al., 2017; Asadi et al., 2019). Trained dieticians, asked participants to describe their consumption frequency for each food item during the previous year on a daily, weekly, monthly, rarely or never basis. Food analysis was undertaken using Diet Plan 6 software (Forest field Software Ltd, Horsham West Sussex, UK).

The Healthy Nordic food index (HNFI) scores were determined according to the method of Olsen *et al* (Olsen et al., 2011). In order to adapt the HNFI to the FFQ used in this study, we created six groups based on the same micronutrient content. This modified ND score which was validated for the Iranian population (Daneshzad et al., 2018) was based on: (1) whole grains (2) legume (lentil, beans, soybean), (3) fish (fish conserved in salt and oil and other fish), (4) cabbages and vegetables (cucumber, lettuce, tomato, spinach and leafy vegetables), (5) root vegetables (potato, garlic and onion), (6) fruits (fruit juice, dry and fresh fruits). we computed for above middle receive and, 0 points for below middle receive for any item. The scale of any group was summed and were classified as: 'low adherence' for those scoring 0–1 point, 'medium adherence' for those scoring 2–3 points and 'high adherers' as those scoring 4–6 points.

2-3: Questionnaires and Measurements

2-3-1: Cognitive Ability Questionnaire (CAQ)

The Cognitive Ability Questionnaire (CAQ) assesses 7 components of cognitive function, including: memory, inhibitory control and selective attention, decision making, planning, sustainable attention, social cognition and cognitive flexibility. The daily measurable activities in each of the cognitive domains were presented in the form of test items. Questions were designed for each indicator and a number of questions were asked for each indicator in the questionnaire. The questionnaire was rated on a 30-point Likert scale of five options from one (almost never) to five (almost always) to add a total score of 30 to 150 (Cronbach's alpha=0.834). Higher scores indicate better cognitive performance (Nejati, 2013). All of the subscales had good reliability in the present sample, with a Cronbach's alpha of 0.71–0.85.

2-3-2: *Depression Anxiety Stress Scales (DASS)*

The DASS is a 42-item self-assessment questionnaire designed to measure the severity of three negative emotional states: depression, anxiety and stress. DASS-depression emphasizes aspects of mood, motivation and self-esteem, DASS-anxiety about arousal and fear and DASS-stress on stress and irritability. A four-point score is used for each of the 42 items that were assessed for the past week. A printed cover was used to obtain the total score for each subscale. Higher scores on each subscale indicate the severity of depression, anxiety or stress (Parkitny and McAuley, 2010; Sahebi et al., 2005). The version we used was a shorter version called DASS-21. Each of the DASS-21 subscales contains 7 questions, each of which is scored through the sum of the scores of the related questions. Each question is rated from 0 (not true for me at all) to 3 (absolutely true for me). The subscale scores from the shorter questionnaire are converted to DASS normative data by multiplying the total score by 2. The Persian version of this questionnaire was used which the validity and reliability of this for depression, anxiety and stress have been confirmed for the Iranian population (0.87, 0.85 and 0.75, respectively) (Samani and Joukar, 2007). In the present work, Cronbach's alpha was identified to be 0.85, 0.73 and 0.81 for depression, anxiety and stress, respectively.

2-3-3: Insomnia Severity Index (ISI)

The ISI is a 7-item self-report questionnaire determining the nature, severity, and impact of insomnia. The dimensions measured are: severity of sleep onset, sleep preservation, and early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress effected with the sleep difficulties (Morin et al., 2011). A 5-point Likert measure is applied to level any part (e.g., 0 = no problem; 4 = very severe problem) yielding a total scale ranging from 0 to 28. The total scale is explained as follows: loss of insomnia (0-7); sub-threshold insomnia (8-14);

mild insomnia (15-21); and, severe insomnia (22-28). The Persian version of this questionnaire, the validity and reliability of which have been confirmed in the Iranian population (Cronbach’s alpha >0.8 and intra-class correlation coefficient >0.7), was used (Yazdi et al., 2012). In the present sample, reliability was evaluated by Cronbach Alpha which was 0.84.

2-3-4: Epworth Sleep Scale (ESS)

The ESS was designed to assess sleep patterns in a simple and standard way (Johns, 1991). The questionnaire consists of 8 items that assess the average degree of tendency to daily drowsiness. Each item is ranked on a 4-point Likert scale. The Persian version of this questionnaire, the validity and reliability of which have been confirmed in the Iranian population (Cronbach’s alpha = 0.8 and intra-class correlation coefficient = 0.8), was used (Haghighi et al., 2013). Higher scores than ESS indicate a greater tendency to fall asleep or daytime sleepiness. Normal values are between 0 and 10 a score of 10-16 indicates mild to moderate drowsiness, and more than 16 is defined as severe drowsiness. In the present sample, Cronbach’s alpha was 0.73.

2-3-5: Quality of Life Questionnaire (QLQ)

The Short form-12 (SF-12) questionnaire is one of the most widely used tools for evaluating the abbreviated form of SF-36 (Juniper et al., 1999). The Persian version of this questionnaire, the validity and reliability of which have been confirmed in the Iranian population (Cronbach's alpha for physical and mental health was 0.73 and 0.72, respectively), was used (Montazeri et al., 2009). The questionnaire consists of twelve questions that examine eight areas of health to assess physical and mental health, and given the low number of items, the overall score is often used. Higher scores indicate better health.

In the present sample, Cronbach's alpha for physical and mental health was 0.75 and 0.71, respectively.

2-4: Anthropometric assessments

Demographic and anthropometric characteristics including age, height, weight, waist circumference, and hip circumference were obtained in a health center by a specialist nurse. Height was determined using a fixed measuring tape on the wall and body weight was measured using a calibrated personal scale. BMI was calculated using the following formula: BMI = body weight (kg)/(body height (m))^2.

2-5: Statistical analysis

Windows 16.0 SPSS statistical software was used for statistical analysis. Any missing data was obtained by telephoning subjects if necessary. Participants were categorized based on their adherence to the ND. First, all variables were analyzed using Kolmogorov-Smirnov test, and if the normality of data distribution was confirmed, the analysis was performed by parametric statistical tests. Continuous and categorical indices demonstrated by mean±standard deviation (SD) and number (percent), respectively. One-way analysis of variance (ANOVA) was used to evaluate the significant difference in normal variables between groups. Finally, the evaluation of following the ND pattern and the score of different experiments on neural function was performed by multivariate linear regression between the rate of receiving each of the components of the score. All analyzes were considered bilateral and p-value <0.05 significant.

3. Result

3-1:General characteristics and anthropometrics parameters of the population

Participants were divided into three groups: participants with low adherence to the ND (n = 29), subjects with moderate adherence to the ND (n =79), and people with high levels of ND adherence (n=73). There was no significant differences in anthropometric parameters, between the three different groups for ND adherence (Table 1; P>0.05).

3-2: Relation of participants' diets in different groups adherence to ND

Evaluation of participants' dietary composition in different groups showed that the adherence to the ND was significantly associated with a higher intake of energy, carbohydrates, protein, fiber, iron, magnesium, potassium, zinc, folate, phosphorus, vitamin C, thiamine, riboflavin, niacin, vitamins B6 and B12, carotene, whole grain, legume, cabbages/vegetables, root vegetables and fruits (Table 2; P <0.05).

3-3:Association between psychological function and adherence to ND

Adherence to the ND showed no significant relationship with any of the factors of psychological function including cognitive abilities, depression, anxiety, stress, quality of life, insomnia and daytime sleepiness scores (Table 3; p>0.05).

Multivariate linear regression analysis between the intake of any part of the score made to evaluate the dependence to the ND and score of neuropsychological function tests is shown in Table 4. Linear regression showed an inverse association between cabbages/vegetables consumption and scores of anxiety (β =-0.02; 0.049) and stress (β=-0.04; P=0.038). A positive correlation was found between the quality of life score and cabbages/vegetables intake (Table 4). In contrast, wholegrain, legume, root vegetables, fruits and fish were not related to any psychological function test score (p>0.05).

4. Discussion:

We have evaluated the association of the ND pattern and neurological performance factors such as memory, stress, anxiety, and sleep disorders. A previous study included a description of the ND that included the following: more calories from plant foods and fewer calories from meat. It also emphasized food sourced from the sea, lakes and wild suburbs (Mithril et al., 2012). In the present study, we analyzed data from 181 female students and found that a diet rich in vegetables was associated with a significantly lower stress and anxiety score.

The Department of Health and the U.S. Department of Agriculture has encouraged people to change their food consumption patterns toward choosing a diet based on vegetables, fruits, whole grains, and nuts (McGuire, 2011). Reducing fat and increasing fiber, fruits, and vegetables has become a national priority in American diets. The American Heart Association and the US National Centers for Disease Control and Prevention also recommend that people choose a diet with at least five servings of fruits and vegetables a day (Krauss et al., 1996). Fruit and vegetables play an important role in ND and are considered health promoters due to their properties. Cabbage and root vegetables can be part of the daily diet throughout the year. Vegetables are rich sources of fiber, vitamins A, B and C, and minerals such as calcium and iron (Mithril et al., 2013). Vitamin C (ascorbic acid) is an antioxidant that affects anxiety, stress, depression, fatigue and mood. On the other hand, oxidative stress may cause neurological disorders in humans, and antioxidants are an important treatment for this condition (Mazloom et al., 2013). Cabbage contains vitamin K, antioxidants, fiber, folate and several carotenoids (Mithril et al., 2013) which may increase overall health, and play a preventive role in cancer (Sanchez-Villegas et al., 2006).

Our results also showed that consuming vegetables is associated with a significantly higher quality of life. In one study, parents believed that eating vegetables in a child was vital and accompanied by an increase in children's health and vitality (Hingle et al., 2012). In another study, people were encouraged to change their diet to low-fat, high-fiber, high-fiber foods, fruits and vegetables. Evidence suggests that this change in dietary pattern is successful without adversely affecting quality of life (Corle et al., 2001). According to our study, fruit intake was inversely with stress score, and positively associated to quality of life. Sanchez et al. reported a positive correlation between the amount of fruit and vegetables consumed and, physical and mental health status. Also, the rise in fruit and vegetable intake was linked by a direct change in physical health situation at 8 weeks (Sánchez et al., 2012). Fukumitsu studied the effect of olive intake on quality of life and, reported that after 12 weeks of an increased intake of olives, significantly decreased body weight and body mass index, joint pain and inflammatory diseases. It also improved the quality of life for participates (Tesoriere et al., 2004). Randomized trials have been conducted to evaluate the effect of interventions on quality of life, health status and the relationship between changes in fruit and vegetable consumption, plasma vitamins C and E in adults. This intervention improved the health associated quality of life because increasing the intake of fruits and vegetables and the amount of vitamin plasma led to the stimulation of beneficial changes in the state of physical health in adults (Duthie et al., 2018).

In our study, we did not find a significant relationship between psychological factors and ND adherence. In line with our findings, the results of a study among 111 depressive patients and 136 control participants showed that folic acid intake from rich foods such as grains and dietary supplements and total dietary folate was not significantly correlated among depression in late life. This result suggests that different forms of dietary folate may have different effects on depression and mental health (Payne et al., 2009). Another study looked at the correlation among depressive signs and a diet high in folate, B vitamins and omega-3 unsaturated fatty acids in 309 Japanese men and 208 Japanese women aged 21-67 years old. The results showed a significant relationship between folate consumption and depressive symptoms in men, but no significant correlation was found in women. On the other hand, no statistically significant relationship was observed between depressive symptoms with riboflavin, pyridoxine, cobalamin, omega-3, alpha linolenic acid, isocapentaenoic acid or docosahexaenoic acid in both sexes (Murakami et al., 2008). Consistent with this, in a study among older adult with an average age of more than 65 years, no significant relationship was found between the consumption of food patterns containing "fish meat" with the presence of depressive symptoms. Although there were a number of factors involved in analyzing the data, there may be other factors associated with depression, such as a family history of depression and recent stressful events in life, they said (Chan et al., 2014). Montonen et al hav reported that a high consumption of red meat is associated with inflammation and oxidative stress (Asghari et al., 2017).

In the present paper, foods considered to be part of a "ND" are defined as examples of health-promoting diets. Importantly, all ND foods are available from supermarkets and this diet content is high in unprocessed food including fruits, legumes and vegetables. This provides reproducibility of this study and facilitates the use of ND diet amongst the general population. But implementing this diet can be very challenging. One of the first challenges is to emphasize the consumption of fish and meat in this diet. The commercial production of meat and fish has many ecological consequences (Poulsen et al., 2014; Bere and Brug, 2009). Excessive hunting and fishing are also problematic for the environment. In addition, it may not be possible to order all foods naturally and locally. Also the cross-sectional nature and retrospective data of our study cannot show causality and this study tests volunteers in a specific age range and does not count men or women of high age, then it is worthwhile to study the effects of the ND on some age and sex classes in future studies.

5. Conclusion

A diet which is rich in vegetables and fruits may be of potential value in managing stress and anxiety and an increased quality of life. It is also noteworthy that the combined improvement in stress, anxiety as well as quality of life may be clinically more important compared to improving single risk factors.

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Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Ethical approval was obtained from the Ethnic committee of Birjand University of Medical Sciences. Informed consent was obtained from all individual participants included in the study (IR.BUMS.REC.1398.402).

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Table 1. General characteristics and anthropometrics parameters of study participants

Variables	**ND adherence**			**P value†**
	Low (n=29)	**Medium (n=79)**	**High** (n=73)	
Age (year)	20.7±1.7	20.9±1.8	20.7±1.6	0.85
Weight (kg)	51.5±7.5	55.6±7.0	54.9±8.9	0.11
BMI (kg/ m^2)	20.1±2.6	21.0±2.6	20.9±3.2	0.44
WHR	0.73±0.04	0.74±0.03	0.73±0.04	0.23

Abbreviations: Body mass index (BMI); Waist-to-hip ratio (WHR); Systolic blood pressure (SBP); Diastolic blood pressure (DBP).
†obtained from ANOVA test.

Table 2. Dietary intakes of participants in different tertiles of the adherence to the Nordic dietary pattern scores				
Variables	**ND adherence**			**P value†**
	Low (n=29)	**Medium (n=79)**	**High** (n=73)	
Energy (kcal/d)	1840±749	2166±769	2307±770	**0.044**
Carbohydrate (g/d)	155.7±67.6	224.3±127.4	249.2±149.7	**0.005**
Protein (g/d)	63.1±30.8	76.8±55.7	94.7±56.0	**0.014**
Fat (g/d)	123.5±136.8	135.7±107.9	196.1±240.1	0.06
Dietary fiber (g/d)	8.9±5.1	14.7±6.2	21.5±12.6	**<0.001**
PUFA (g/d)	44.6±75.9	40.2±52.7	60.6±113.4	0.33
MUFA (g/d)	40.8±34.4	55.8±56.4	67.8±65.8	0.094
Iron (mg/d)	5.2±2.1	7.9±4.7	10.7±6.4	**<0.001**
Magnesium (mg/d)	192.3±84.2	301.1±257.1	366.0±189.7	**0.001**
Phosphorous(mg/d)	918.3±401.8	1141±873	1419±878	**0.013**
Zinc (mg/d)	6.3±2.9	8.0±6.2	10.1±6.8	**0.010**
Folate(µg/d)	133.6±51.1	205.7±126.8	272.1±125.2	**<0.001**
Potassium (mg/d)	1761±684	2637±1544	3470±1713	**<0.001**
Calcium (mg/d)	630.9±351.4	746.2±596.4	904.6±865.2	0.15
Selenium(µg)	37.2±15.6	50.1±49.1	56.0±33.1	0.054
Vitamin C (mg/d)	61.7±54.1	119.8±100.6	178.5±117.4	**<0.001**
Vitamin E (mg/d)	39.5±60.7	38.2±43.7	53.9±86.5	0.33
Biotin (µg/d)	30.1±18.1	49.9±68.8	53.8±30.1	0.095
Thiamin(mg/d)	0.81±0.31	1.3±1.1	1.7±1.0	**<0.001**
Riboflavin(mg/d)	1.04±0.47	1.3±0.94	1.5±0.86	**0.034**
Niacin(mg/d)	12.4±8.9	15.6±14.1	19.3±9.5	**0.019**
Vitamin B6 (mg/d)	0.97±0.48	1.3±0.81	1.9±1.7	**0.001**
Vitamin B12 (µg/d)	3.1±1.4	4.1±3.9	5.3±5.1	**0.043**
Carotene (µg/d)	621.4±514.3	852.4±459.1	1479±964.9	**<0.001**
Wholegrain (g/d)	21.7±59.6	21.7±29.0	47.6±46.4	**<0.001**
Legume(g/d)	10.6±8.8	21.7±20.2	35.7±46.1	**0.001**
Cabbages/vegetables (g/d)	40.0±38.9	104.4±105.4	196.9±173.3	**<0.001**
Root vegetables (g/d)	10.2±9.0	35.3±43.3	74.4±85.7	**<0.001**
Fruits (g/d)	102.7±104.1	194.6±171.1	279.2±226.4	**<0.001**
Fish (g/d)	7.2±7.6	17.4±45.2	20.2±21.9	0.21
Data presented as mean±SD. †obtained from ANOVA test.				

Table 3. Association between neuropsychological function and adherence to Nordic diat

Variables	**ND adherence**			**P value†**
	Low (n=29)	**Medium (n=79)**	**High** (n=73)	
Test of cognitive abilities				
Memory	25.5±3.5	25.4±3.3	25.4±3.3	0.98
Inhibitory control and selective attention	22.8±4.0	21.8±3.9	21.5±3.8	0.35
Decision making	19.8±3.3	18.2±3.9	19.1±3.5	0.097
Planning	11.7±2.4	10.8±2.8	10.9±3.0	0.33
Sustain attention	10.0±2.3	9.5±2.5	9.1±2.2	0.16
Social cognition	10.9±2.0	9.5±2.5	9.1±2.2	0.27
Cognitive flexibility	14.7±2.5	14.1±2.8	14.8±2.8	0.32
Total cognitive ability task	115.5±12.2	110.3±14.4	111.8±14.3	0.24
Dass-21				
Depression	11.5±8.5	11.2±9.4	11.0±8.7	0.98
Anxiety	7.6±5.9	9.4±6.3	9.0±6.5	0.45
Stress	14.3±9.5	18.5±10.5	18.3±9.1	0.15
Quality of life (SF-12)				
Physical health	16.3±2.2	15.5±2.7	15.7±2.5	0.39
Mental health	16.6±3.9	16.5±3.8	16.1±3.5	0.82
SF-12 score	32.9±5.6	32.3±5.1	31.9±4.9	0.67
Test of sleep pattern				
Insomnia score (ISI)	6.4±6.8	6.5±7.4	5.9±6.3	0.83
Daytime sleepiness score (ESS)	4.6±5.0	6.5±6.0	6.9±6.1	0.22
Nocturnal sleep hours	7.0±1.2	7.2±1.5	7.4±1.2	0.54

Data presented as mean±SD
†obtained from ANOVA test.

Table 4. Multivariate linear regression between intake of each component of the score built to evaluate the adherence to the Nordic dietary Pattern and score of neuropsychological function tests

Component of the Score	Cognitive abilities		Depression		Anxiety		Stress		Quality of life		Insomnia		Daytime sleepiness	
	β	P	β	P	β	P	β	P	β	P	β	P	β	P
Wholegrain	0.02	0.69	0.02	0.57	-0.01	0.61	0.007	0.84	0.02	0.41	-0.04	0.18	-0.02	0.44
Legume	-0.17	0.09	0.05	0.47	0.08	0.10	-0.01	0.86	0.03	0.45	-0.04	0.44	0.07	0.12
Cabbages/vegetables	0.03	0.22	-0.03	0.07	-0.02	**0.049**	-0.04	**0.038**	0.02	**0.036**	0.01	0.59	0.006	0.55
Root vegetables	-0.01	0.82	-0.006	0.85	-0.005	0.84	0.02	0.61	-0.02	0.23	0.005	0.86	-0.01	0.66
Fruits	-0.003	0.83	-0.002	0.86	0.007	0.30	0.02	0.06	-0.010	0.056	-0.003	0.71	0.005	0.42
Fish	-0.10	0.47	-0.03	0.76	-0.04	0.56	0.004	0.97	0.01	0.87	-0.07	0.32	0.03	0.68

Adjusted for age, BMI, WHR and energy intake.
Significance of bold values <0.05.